SHAPE GRAMMAR INTERPRETER FOR RECTILINEAR FORMS

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Abstract. In this work we present a general tool named Shape Grammar Interpreter (SGI) for the generation of rectilinear designs. The developed shape grammar framework allows the designer to obtain automatically generated designs and to participate in the design process.

1. Software Description

Shape Grammar Interpreter [1] is a complete and robust tool used to define shape grammars and generate new designs. It allows the user to comfortably specify shapes and rules. User also has complete control over grammar generation process.

The developed shape grammar interpreter (SGI) is a platform-independent tool with ability to create and process any shape grammar based on coplanar and rectilinear shapes with full support of labeled rules and subshape detection. Our subshape detection algorithm is a modified version of Krishnamurtis [2] algorithm. Our modification allows real-time subshape detection.

Another important aspect of this tool is the object-oriented design that allows future programmers to easily extend current functionalities. SGI is programmed in JAVA and offered as open-source to provide possibilities of joint development in different shape grammar communities. Great effort has been devoted on having a comfortable way of defining shapes and later using them in shape grammar rules.

The user creates shapes by drawing them on canvas using a mouse. Rules are operated in a similar manner; the user creates rules by specifying the spatial relation among shapes either parametrically or by mouse. Existing shapes are used to create rules of a shape grammar. The tool supports *addition, substitution and modification* rules. It contemplates undeterministic shape grammars, characterized by the possibility of applying several rules in one generation step. Several mechanisms are implemented to select a candidate shape and the rule to proceed in generation process. All modifications of the current grammar are persisted in XML file for future use. For more details see [1].

References


2. Details and Screenshots

The Youtube channel [http://www.youtube.com/user/tomiiiino](http://www.youtube.com/user/tomiiiino) presents series of tutorial videos describing different possibilities of the software.

The screenshot above shows the interface of the SGI tool. The list of currently defined shapes and rules is on the left side. A dynamic menu and a dynamic toolbar are on the top side. An editor area is located in the central part where the user creates and modifies all rules and shapes. Helper windows, such as debug tree, debug view, property editor and a dynamic help window appear in the bottom part of the user interface.

The screenshot above shows the renderer window containing one of the possible designs generated from the shape grammar showed in previous screenshot.